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10/080,933	02/22/2002	Jianzhong Zhang	59864.00665	6502

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EXAMINER	
CORRIELUS, JEAN B	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/080,933	ZHANG ET AL.	
	Examiner	Art Unit	
	Jean B. Corrielus	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21,23-28,30-33,36-38 and 40-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21,23-28,30-33,36-38 and 40-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 August 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "88 " and "56" have both been used to designate a prefilter (feedforward filter) see, for instance, page 15, line 8 and page 17, line 1 and page 11, line 9. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 88 mentioned in page15, line 8 and page 17, line 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show a signal connection between the signal filter and the "joint optimizer", shown in fig. 3, as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: page 11, line 9, "decision" is mistyped as "direct".

Appropriate correction is required.

Claim Objections

5. Claims 21, 23-28, 30-33, 36-38, 40-47 are objected to because of the following informalities: claim 21 recites that the DFSE includes a prefilter (feedforward filter). such limitation is not consistent with the specification that teaches that the prefilter (feedforward filter) is independent from the DFSE see fig. 3 and corresponding description text and page 11, lines 8-11. Similar comment applies to similar limitations, recited in claims 23-28, 30-33, 36-38, 40-47. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 43-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 43 recites "a computer readable storage medium encoded with instructions that when executed by a computer perform a

process..." is not supported by the specification as filed. Similar comment applies to claims 44 and 45.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 38 and 40-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Regarding claim 38, the word "means" is preceded by the word(s) "prefilter" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967). Claim 40-42 are likewise rejected because of their dependency to claim 38.

11. Claim 21, 23-28, 30 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites "a prefilter, a summing element, a feedback filter and a maximum likelihood sequence estimator" without the necessary connection between the components to form the DFSE. Claims 23-28, 30 and 31 are likewise rejected because of their dependency to claim 21.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 21, 23-26, 28, 30, 38, 40-42 , 46-47 are rejected under 35 U.S.C. 102(e) as being anticipated by Zangi et al US patent No. 6,775,322 et al.

As per claim 21, Zangi et al teaches a receiving station (figs. 1 and 3) comprising a signal filter see col. 3, lines 47-50 inherently in communication with a signal receiving antenna (note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station therefore it has to include an antenna); a signal estimator 122 in communication with the signal filter see col. 4, lines 57-60; circuit (124) corresponding to the claimed (signal optimizer) in communication with the signal filter since it receives it output from the estimator 122 to calculate the coefficients (optimized values); circuits (101 and 108) considered as the claimed decision feedback estimator see col. 2, lines 12-14 in communication with circuit 124 (signal optimizer) for receiving the filter coefficients (optimized values) , Zangi et al further teaches that circuits (101 and 108) the decision feedback estimator includes a summing device 106 in communication with a prefilter 102 and a feedback filter 104 in communication with circuit 124 (signal optimizer) and the summing element 106, and a MLSE 108 in communication with the summing device 106 see col. 11, lines 9-12. note that the interconnection of the prefilter, the

feedback filter, the MLSE and the summing element cooperatively operate to permit inherently concurrent interference and prefilter operation to be performed because there is no structural difference between the Zangi's claimed features of prefilter, the feedback filter, the MLSE and the summing element and the applicant claimed features of "prefilter, the feedback filter, the MLSE and the summing element".

As per claim 23, Zangi et al teaches that the output of the decision device (MLSE) 108 is configured to transmit generated maximum likelihood values through an output to the feedback filter 104 and the input of the decision device (MLSE) 108 is configured to receive summed values from the summing element 106.

As per claim 24, Zangi et al teaches the feedback filter 104 comprises a first input in communication with circuit 124 (signal optimizer) and configure to receive the optimized values from the circuit 124 (signal optimizer) and a second input configured to receive the generated maximum likelihood values from the MLSE 108.

As per claim 25, Zangi et al further teaches the summing element 106 receives inputs from prefilter 102 and the feedback filter 104 and sends a summed output to the MLSE device 108.

As per claim 26, the signal filter see col. 3, lines 47-50 is located in the forward path of the receiving station hence it has to be a feedforward filter.

As per claim 28, Zangi further teaches that the feedback filter 104 receives optimized signals from the signal optimizer 124 that are used to define filter characteristics of the feedback filter 104 see col. 4, lines 57-60.

As per claim 30, the signal filter see col. 3, lines 47-50 and the signal estimator 122 is placed in the received chain of the receiving station see fig. 1.

As per claim 38, Zangi et al teaches a receiving station (fig. 1 and 3) comprising see col. 3, lines 47-50 inherently in communication with a signal receiving antenna (note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station therefore it has to include an antenna); a signal estimator means 122 in communication with the signal filter means; means 124 corresponding to the claimed signal optimizer means in communication with the signal filter means for generating coefficients (optimized values); means101 and 108 considered as the claimed "interference cancellation means" in communication with means 124 (signal optimizer means) for receiving the coefficients (optimized values). Zangi further teaches that circuits 101 and 108 (decision feedback estimator) includes a summing device 106 in communication with a prefilter 102 and a feedback filter 104 in communication with circuit 124 (signal optimizer) and the summing element 106, and a MLSE 108 in communication with the summing device 106 see col. 11, lines 9-12. note that the interconnection of the prefilter, the feedback filter means, the MLSE means and the summing means cooperatively operate to permit inherently concurrent interference and prefilter operation to be performed because there is no structural difference between the Zangi's claimed features of prefilter, the feedback filter means, the MLSE means and the summing means and the applicant claimed features of "prefilter , the feedback filter means, the MLSE means and the summing means".

As per claim 40 see claim 23.

As per claim 41 see claim 24.

As per claim 42, Zangi et al further teaches the summing element 106 receives inputs from prefilter 102 and the feedback filter 104 and sends a summed output to the MLSE device 108 and an output of the MLSE being an output from the receiving station see fig. 3.

As per claim 46 the apparatus is a mobile communication device. See col. 3, lines 29-30.

As per claim 47 the device is inherently an integrated circuit because mobile communication devices uses IC circuit.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al US patent No. 6,775,322 et al. in view of Taylor US Patent Application No. 2002/0197987.

As per claim 27, as applied to claim 25 above, Zangi et al teaches every feature of the claimed invention but does not explicitly teach the further limitation of a deinterleaver in communication with an output of the MLSE estimator and depuncture in communication with a deinterleaver and a channel decoder in communication with the deinterleaver. Taylor et al teaches a deinterleaver 58 in communication with an output

of the MLSE estimator (i.e. output of demodulator/equalizer 56) and depuncture 62 in communication with a deinterleaver 58 and a channel decoder 64 in communication with the deinterleaver 58. It would have been obvious to one skill in the art to incorporate such a teaching in Zangi et al in order to recover the originally transmitted signal.

16. Claims 31-34, 36 and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al US patent No. 6,775,322 in view of Malkemes et al US Patent Application publication S/N US2002/0106040 A1.

As per claim 31, as applied to claim 30 above, Zangi et al teaches every feature of the claimed invention but does not explicitly teach that the receiving station comprises a plurality of receive chains that corresponds to a plurality of signal receiving antennas configured to receive and transmit a plurality of signal vector to the plurality of receive chains. Malkemes et al teaches the receiving station (fig. 1) comprises a plurality of receive chains see fig. 1) that corresponds to a plurality of signal receiving antennas 102 configured to receive and transmit a plurality of signal vector to the plurality of receive chains. Given that fact, it would have been obvious to one skill in the art to incorporate such a teaching in Zangi et al in order to improve signal detection since the system would have been able to be configured to receive multiple copies so that existence of signal error can be easily determined.

As per claim 32, see claim 31. In addition, Zangi teaches transmitting the coefficients (optimized teed forward filter parameters and the optimized feedback filter parameters) to a decision: feedback sequence estimator (101 and 108), wherein the

decision feedback sequence estimator (101 and 108) comprises a feed forward filter 102 and a feedback filter 104: note that the limitation "simultaneously" is interpreted as "both". Clearly Zangi teaches that "both" interference cancellation and prefiltering operations are performed via the feedforward filter 102 and the feedback filter 104. see col. 4, lines 43-50.in addition, for the sake of argument, note that the prefiltered signal from feedforward filter 102 is provided as input to the summer 106 at the same time as the ISI compensated signal generated by feedback filter 104 (see col. 7, lines 15-21) another indication that the prefilter and ISI compensation are performed simultaneously.

As per claim 33, Zangi et al further teaches the feedforward filter 102 filters the data vector and transmitting a feedforward output to a summing element 106; receiving an output of the summing element in a MLSE device 108 and generating an output of that is transmitted to an input of the feedback filter 104 and subsequent component and filtering the output received from the MSLE device in the feedback filter 104 and transmitting a filtered signal to the summing element 106.

As per claim 34, the interference cancellation and prefiltering includes filtering the data vector in prefilter 102 and processing the data vector with a DFSE 108.

As per claim 36, Zangi further teaches the received chain comprises a receiving filter see col. 3, lines 47-50 inherently in communication with a signal receiving antenna (note fig. 1 is described by Zangi as see col. 3, lines 29-30, as a mobile station therefore it has to include an antenna); a channel estimator 122 in communication with the receiving filter; the channel estimator 122 in communication with circuit 124

corresponding to the claimed signal optimizer configured to optimized feedforward and feedback filter parameters see col. 5, lines 1-27.

As per claim 43, see claim 32. In addition, the applied references fail to teach that the invention can be implemented in a computer readable medium. However, it would have been obvious to one skill in the art to implement the invention in a computer readable medium in order to minimize implementation cost.

As per claim 44, see claim 33.

As per claim 45, see claim 37.

17. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zangi et al US patent No. 6,775,322 in view of Malkemes et al US Patent Application publication S/N US2002/0106040 A1 and further in view of Taylor US Patent Application No. 2002/0197987.

As per claim 37, as applied to claim 33 above, Zangi et al and Malkemes et al teach every feature of the claimed invention but do not explicitly teach the further limitation of a deinterleaver in communication with an output of the MLSE estimator and depuncture in communication with a deinterleaver and a channel decoder in communication with the deinterleaver. Taylor et al teaches a deinterleaver 58 in communication with an output of the MLSE estimator (i.e. output of demodulator/equalizer 56) and depuncture 62 in communication with a deinterleaver 58 and a channel decoder 64 in communication with the deinterleaver 58. It would have been obvious to one skill in the art to incorporate such a teaching in Zangi et al and Malkemes in order to recover the originally transmitted signal.

Response to Arguments

18. Applicant's arguments filed 6/6/08 have been fully considered but they are not persuasive. it is alleged that "Zangi discloses generating optimized values within DFE/DSE equalizer 100; therefore, the DFE/DFSE 100 is not configured to receive the generated optimized values". Examiner disagrees. Zangi clearly shows in the embodiement of fig. 4, that the DFSE circuit can be independently provided from the circuit 124 (optimizer) and the signal estimator 122, consistent with the position taken in the office action. Examiner also notes that, for the sake of argument, even if applicant was right which the examiner does not admit to, there would not be any structural differences between providing the estimator and the optimizer inside or ouside of the DFSE. As long as the overall circuit structure remains the same no matter how one chooses to group the circuits components in the figures using **doted lines** and/or name them, the circuit functionality of drawing figures will remain unchanged. In addition, the argument made with respect to Taylor and or Malkemes is moot since Zangi teaches the noted claimed limitations. With respect to claim 32, contrary to applicant's position, Zangi clearly teaches coeffcients (optimized feedforward and feedback filter parameters) are transmitted to a DFSE circuit (101 and 108). In addition, see above comment.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Monday-Thursday from 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jean B Corrielus/
Primary Examiner
Art Unit 2611